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# **A logic model approach to the development of an educational app**

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## **Abstract**

Technological educational resources require planning and structure to ensure successful implementation. This article describes the development, and evolution of, an online educational training package for third year undergraduate nursing students. The article explains how a logic model was used as a framework to support development and implementation of an online clinical supervision supervisee training programme, and describes its evolution to an app for portable mobile devices.

**app technology, clinical supervision, logic model, nurse education, nursing management**

## **Introduction**

Logic models are often used to evaluate projects or new interventions, but they can also be used to guide the planning and implementation stages. Using a logic model in the development of an online clinical supervision supervisee training programme for undergraduate nurses provided a framework from which to plan the resources needed, and to focus on the expected outcomes. Logic models are graphic illustrations of the 'logical relationships' between the resources, activities,

outputs, and outcomes of a project or intervention, and several models are available. This project used the Wisconsin model (Taylor-Powell et al 1996).

## **Background**

The development of an online teaching tool arose from the need to formalise reflective clinical supervision skills training in the undergraduate nursing curriculum at Queen's University Belfast. The Department of Health, Social Services, and Public Safety (2007) recommended that clinical supervision skills should be developed in undergraduate nursing, and research suggests that this better prepares nursing students for this aspect of their role when they become registered nurses (Carver et al 2007, Haggman-Laitila et al 2007, Staun et al 2010). It was hoped that the introduction of clinical supervision supervisee training in undergraduate nurse education would enable a continuum of post-registration professional development (McCutcheon 2013).

With the training need identified, the project leaders faced the logistical difficulty of accommodating large numbers of nursing students, therefore they explored the option of delivering the training through technology.

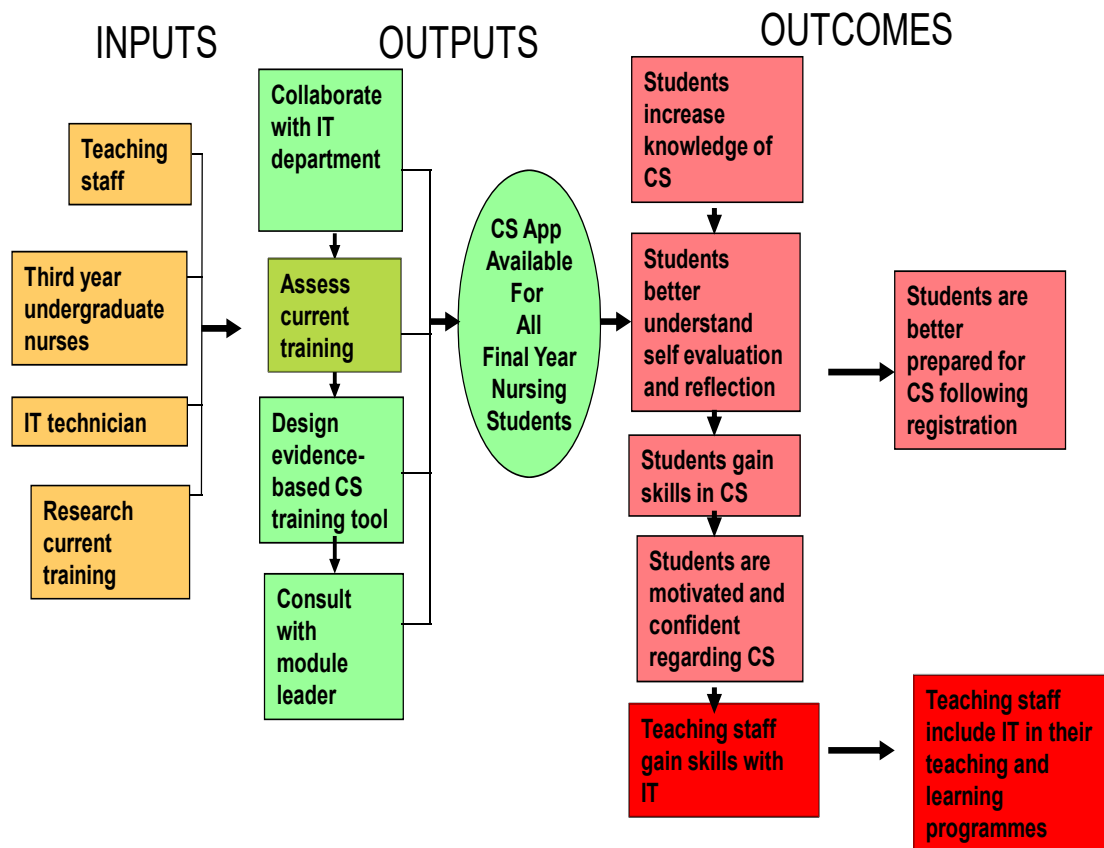
## **Project aims and objectives**

The main aim of the project was to develop a clinical supervision supervisee training programme for use in undergraduate nurse education. A logic model (Figure 1) was used in conjunction with the following three objectives, to guide introduction of the training:

- To develop a teaching tool that reflects modern educational technology, and is easily accessible to nursing students.
- To introduce supervisee training to third year undergraduate nursing students in preparation for supervision post qualification.
- To motivate undergraduate nursing students to identify examples from their clinical experiences, to encourage change, and to promote personal professional development.

Figure 1: Logic model

**SITUATION:** There is a need to introduce CS supervisee training into the undergraduate nursing curriculum.



## Logic model inputs

### Teaching staff, IT staff, and students

The first aspect of the logic model (Figure 1) refers to teaching staff, IT staff, and students. Knowing when the third-year students would be available to undertake the training helped to provide a timescale for completion. Singh and Hardaker (2013) suggest that sharing experiences of an innovation enhances communication and promotes adoption. Without shared communication, lecturers might be uncertain about the introduction of an e-learning initiative (McLean 2005), therefore teaching staff were made aware of the new intervention via email. The inclusion of an IT expert on the project team was essential for enhancing the design and quality of the intervention.

### **Research of current training**

Researching current training involved a web search, and making contact with the Northern Ireland provider of clinical supervision training for registered nurses. Informal inquiries with representatives from the Northern Ireland Practice Education Council for Nurses and Midwives (NIPEC), one of the main secondary care trusts in Northern Ireland, and the chief nursing officer (CNO), were also made to ensure that all appropriate and up-to-date information was included in the training package.

Existing training in post-registration nurse clinical supervision is based on Proctor's (1986) three-function model, which has been widely adopted by the nursing community (Teasdale et al 2001, Winstanley and White 2003, McColgan and Rice 2012). The three components are:

- Formative: refers to the education aspects of clinical supervision - practitioners' skills development.
- Normative: refers to the management aspects of clinical supervision - developing standards and complying with policy.
- Restorative: refers to pastoral support - support and validation from peers.

Reflective practice is central to clinical supervision, so it was important to ensure the teaching tool encouraged students to explore and create their own knowledge base. One of the principles of clinical supervision is self-governance of practice, therefore reflection and learner autonomy were considered essential elements of the teaching tool.

### **Logic model outputs**

The second stage of the logic model refers to outputs, and includes the design of the intervention, and collaboration with the IT department.

#### **Intervention design**

Learning involves students processing and building their own knowledge. Teachers play an important role in supporting this, but this can be difficult with online teaching tools. For example, Baggley (2014) suggests that educational technology, such as Massive Open Online Courses (MOOCs), means students are surrounded by their peers, with no teachers to guide them. Other authors report that lack of support from teachers can result in low levels of student satisfaction, and disengagement (Reime et al 2008, Johnson et al 2013).

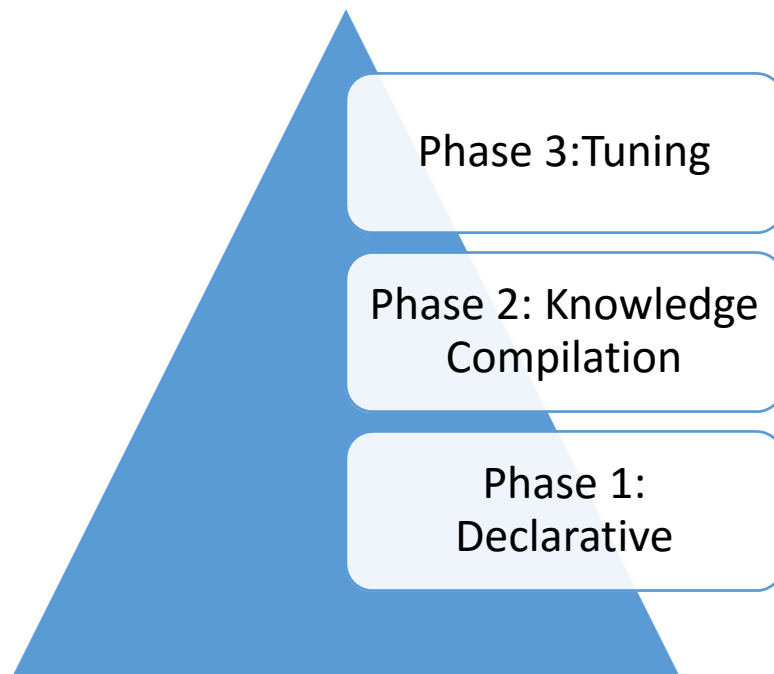
Anderson's (1992) cognitive theory of intelligence and development provided a framework (Figure 2) to guide students through the early stages of clinical supervision supervisee skills acquisition, and helped ensure there would be teacher support. The aim was to encourage student engagement and satisfaction with the online teaching tool.

Anderson's (1992) theory has three stages:

- Declarative stage: teaching theoretical principles.

- Knowledge compilation stage: students translate the theory into procedural knowledge.
- Tuning stage: students develop and 'fine tune' their skills.

**Figure 2: Anderson's (1992) cognitive theory of intelligence and development**



Anderson's (1992) theory was combined with Proctor's (1986) model of clinical supervision in the design of the online resource, which includes hyperlinks and reflective thinking points to encourage students to build their own knowledge. In stage 1, declarative, students are directed, through hyperlinks, to the UK Department of Health patient care inquiry documents, such as the Bristol Royal Infirmary Inquiry (2001), and the Murtagh Inquiry (Regional Quality Improvement Authority 2005), and to Youtube patient safety videos, by the World Health Organization (WHO), and the Just a Routine Operation podcast by Martin Bromiley, the husband of a patient who died following routine surgery. Exploring these inquiries and patient safety videos enables student to build knowledge about the conceptual principles of clinical supervision, linked to Proctor's (1986) formative component.

In stage 2, knowledge compilation, students are directed to links to encourage them to develop and create the rules that govern supervision, and this is linked to Proctor's (1986) normative component. In the final stage, tuning, students are given a set of reflective questions designed to encourage them to apply their learning to a variety of clinical situations, which is linked to Proctor's (1986) restorative validation component.

### **IT department collaboration**

Anderson's (1992) cognitive development theory, and Proctor's (1986) clinical supervision model, were used initially to shape a 'pen and paper' teaching plan and training booklet, and transferring this onto an online software package required technical support. Therefore, a computer technician was approached to discuss the technology options.

There are a variety of online resources available to educators, and the rapid development of technology is continually increasing this inventory (Tallent-Runnels et al 2006, Dearnley et al 2013). However, the professional development and preparation of teachers is inadequate in terms of their ability to use this technology (Lawless and Pellegrino 2007). This lack of 'know how', combined with the ever-increasing repository of online resources, means creating effective online teaching resources is challenging for educators.

Barriers to implementing e-learning can be removed, by developing partnerships with computer technicians, and purchasing user-friendly software programmes (McCutcheon 2013), although there can be disagreements about design, and finding time to collaborate on projects can be difficult (Lison et al 2004). Effective leadership in these partnerships is essential to ensure that individuals are aligned to the tasks that best suit their expertise (McCutcheon 2014), and an appreciation and recognition of individuals' abilities can foster collaborative engagement with the process.

### **Intervention trajectory and app creation**

After consultation with IT colleagues, a clinical supervision e-book was created, incorporating the content of the 'pen and paper' teaching plan and training booklet. An e-book was chosen because of the availability of the software, and its content input was similar to Microsoft Office, which meant it would be easy for novices to use. The e-book could be downloaded to a laptop or computer, but not to a portable handheld device. Unlike a paper book, which is text heavy, the e-book encourages students to construct their own knowledge through directed investigation, using hyperlinks to websites, such as NIPEC Development Framework (NIPEC 2007), and interactive tests linked to clinical supervision principles.

The rapid changes in technology development meant this prototype e-book was soon superseded by a multimedia book. Although this multimedia book also could not be downloaded onto a handheld device, it included several interactive tests, two short video clips, one of which is an animated supervision session, and a podcast. The combination of audio, video, and textual information creates more motivating and stimulating learning experiences (MacDonald 2008, Carvalho et al 2009), and can help maintain learners' interest and involvement (Taktek 2008).

The lack of portability remained an issue, however, as some students did not have access to a computer at home, and there were some technical issues related to Apple Mac© compatibility. This resulted in further discussions with IT colleagues, to try to resolve the problems, and led to a

revision of the multimedia book contents, and the production of a mobile software application (app). Students can download the clinical supervision training app directly onto their android and mobile phones, thereby creating a mobile portable learning system.

The app was piloted with several lecturers and post-registration students to ensure compatibility with Apple Mac®. The main content and multimedia outputs remain the same, but the app offers students the flexibility in learning that was absent from the previous software programmes. The app also enables students to engage with the software functions with greater ease and access.

Mobile devices have been used successfully in formal learning where the content can be divided into parts, but can also be easily connected by the learner (Kukulska-Hulme and Shield 2008). The interactive quizzes, and the ability to use the mobile technology to revise, and build on, the clinical supervision information included in the app, has resulted in a more-student led educational model, where learners decide what aspect of the training to complete, and when. This type of mobile educational technology is an authentic learning tool (Kukulska-Hulme and Shield 2008).

## **Logic model outcomes**

### **Student outcomes**

The final stage of the logic model is outcomes. The uptake of the training was good, and most students engaged in the process. Some student-related outcomes were identified through the logic modelling process, and the author has designed a study to evaluate the students' knowledge of, and motivation towards participating in clinical supervision, and their satisfaction with the online teaching resource. The results will be reported separately, but initial analysis suggests there is no difference in the students' overall motivation and attitudes towards clinical supervision, and their level of knowledge, compared to those who received face-to-face tuition.

### **Teacher outcomes**

As a novice in using online technology for teaching, the author faced a steep learning curve in terms of the development process. The author's feelings of anxiety, and technological incompetence, are consistent with other academics' experiences of introducing technology into their teaching (Singh and Hardaker 2013). However, the sense of satisfaction on completion, and experimenting with software, was a refreshing change from the more traditional methods of teaching.

Academics' loss of 'locus of control', in relation to online learning, is one possible reason for the slow uptake of technology-enhanced learning in some areas (Singh and Hardaker 2013). The pedagogical changes related to online learning challenge traditional educational models, which has induced fear in academics, and a perceived loss of control of the curricula and teaching methodology (Clegg et al 2003, Graham et al 2013). In this project, although there was some loss of control in



terms of the technology software application, the lecturer retained educational control of the content and delivery.

The role of lecturers in the online learning process is different from their traditional teaching roles, in that their function is supportive rather than didactic (Kenny 2002). However, lecturers know how to lead students in independent learning, and social constructive principles in traditional teaching approaches. Successful online education requires a balance between instruction and support, to encourage student self-directed learning, and student-to-student discourse. Lecturers should be encouraged to attend training in supporting online education to ensure success of future online learning programmes, and for the benefit of both students and educators.

## **Conclusion**

The rapid trajectory of technology-enhanced learning is exemplified by the development of this educational intervention, which has changed its software programme three times in less than two years. Advances and trends in technology, although exciting, require planning and structure to ensure successful implementation. In this project, the logic model provided a framework with focus points, which led to the effective development, and introduction of, the teaching tool app.

The rationale for developing the app was the challenge of accommodating large numbers of students, and its creation has helped implement clinical supervision supervisee skills training in the undergraduate nursing curriculum.

Logic modelling is a fast and simple approach that can be adapted by managers in all areas health care, to support and encourage staff to develop and lead projects.

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